

Ethical Issues to be Considered for the Neurosurgeons During the COVID-19 Pandemic

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Abbreviations: PPE: personal protective equipment, TBI: traumatic brain injury.

Dear editor,

We read many articles about the neurosurgeons' experience during the covid-19 pandemic with a great interest, and we were interested in their handling of a topic of a rising importance for neurosurgeons during the Coronavirus Disease 2019 (COVID-19) pandemic. Reading Finn *et al* [1] discussion about the medico-legal considerations about neurosurgeons' practice in response to COVID-19, and the challenges experienced with using personal protective equipment (PPE) encouraged us to dig deeper in the ethical consideration for neurosurgical practice during COVID-19 pandemic.

All physicians learn during their early years of medical schools that their safety is a priority even during lifesaving emergencies [2]. Ensuring their safety is, for example, the first step in cardiopulmonary resuscitation [3]. During the COVID-19 pandemic, a significant debate was raised concerning the ethical consideration of physicians' safety during such a life-threatening pandemic. Several authors have handled the topic from different perspectives [4-6].

The balance between physicians' safety, patients' optimized care, urgency of patients' care needed, and limited resources

were agreed factors that should be considered during ethical recommendations [4-6].

Adding to what we have read concerning ethical issues for the neurosurgeons during the COVID-19 pandemic, the main issue we want to shed the light on is the relative urgency of neurosurgical procedures in comparison to other surgeries. This is essential for patients' optimized care (or duty to care). It is estimated that at least 75 – 115 individuals per 100000 population need urgent neurosurgical interventions annually [7], and delay in such interventions might result in significant morbidity and/or mortality [8]. During COVID-19 pandemic, there was a decline in approximately one third (33.6 %) of the rates of emergent neurosurgical referrals and more than half (55.6 %) of the emergent intervention [9].

As duty to care has no less weight than the physician safety, it is worth mentioning that patients needing neurosurgical interventions are special group of patients whose diseases are time sensitive. As a role in neurosurgery, time is brain [10]. Unlike most of the body cells and tissues, neurons exposed to insults (e.g. compression, ischemia, epileptic activity, trauma, etc.) are prone to irreversible damage as the time passes [11]. This puts a challenging ethical burden to postponing most of



neurosurgical interventions, even elective ones, for safety issues [11]. The longer the time the patient waits prior to his surgery, the less likelihood he might restore his function.

Whilst the rates of emergent neurosurgical interventions declined significantly during the pandemic, the results reported by *Grassner et al.* Whilst the rates of emergent neurosurgical interventions declined significantly during the pandemic, the results reported by *Grassner et al.* TBI), which constitutes a significant proportion (more than 80 %) of neurosurgical interventions [12,13]. The vast majority of neurosurgical interventions are indicated for traumatic brain injury (TBI), stroke-related conditions, tumors, hydrocephalus and epilepsy [14].

The non-significant 30-day mortality reported by *Grassner et al.* [12] despite the declining rates of non-urgent neurosurgical interventions was assuring for many patients and physician. However, the authors did not evaluate patients' morbidity and quality of life [12]. The 'stay home' recommendations and legal regulations to reduce crowd during the COVID-19 pandemic which reduced the overall incidence of TBI, and subsequently urgent neurosurgical interventions [13]. The non-significant 30-day mortality reported by *Grassner et al.* [14] despite the declining rates of non-urgent neurosurgical interventions was assuring for many patients and physician. However, the authors did not evaluate patients' morbidity and quality of life. [15] both mortality and long-term morbidity are urgently needed. Ethical considerations should include a band for those patients whose quality of life and disability are at high risk. Postponing neurosurgical intervention in such cases victimizes their long-term outcome [16]. A nice, proposed approach to select and prioritize non-elective patients is to use functionality rather than electivity to triage neurosurgical interventions during the COVID-19 pandemic [17]. Expert neurosurgeons are needed to develop consensus recommendations for management of both elective and non-elective cases based on their functionality, expected prognosis, window of opportunity available for appropriate management before rescuing their nervous tissue, comorbidities, and available human and non-human resources. Implementation of such an approach would save

patients with ischemic cerebrovascular stroke coming in window of thrombectomy from long-term disability, save patients with refractory epilepsy from the deleterious complications of seizures and status epilepticus, prevent acute complications of hydrocephalus and optimize the outcome of non-traumatic hemorrhage such as ruptured aneurysms or vascular malformations.

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